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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants	:	Frank-Olaf Mahling et al.
Application Number	:	10/535,375
Filed	:	May 19, 2005
Title	:	SAFE REMOVAL OF VOLATILE, OXIDIZABLE COMPOUNDS FROM PARTICLES, IN PARTICULAR POLYMER PARTICLES
Group Art Unit	:	1793
Examiner	:	Ngoc-Yen M. Nguyen
Docket No.	:	LU 6066 (US)

Mail Stop: Appeal Brief—Patents
Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

I. REAL PARTY IN INTEREST

The real party in interest is Basell Polyolefine GmbH.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellants, their representatives, or their assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

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III. STATUS OF CLAIMS

Claims 1-12 and 19-21 are on appeal. Claims 13-18 were withdrawn due to the restriction requirement.

IV. STATUS OF AMENDMENTS

Claims 13-18 were withdrawn due to the restriction requirement. Claims 1-12 and 19-21 were amended during prosecution. No claim amendments are made in this Appeal Brief.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1 is the only independent claim on appeal. Remaining claims 2-12 and 19-21 depend, directly or through intervening claims on claim 1. Claim 1 claims a method of safely removing at least one volatile oxidizable compound which can form an explosive mixture with oxygen from particles (2) present in a container (1). See Specification, page 2, lines 7-15, Figure 1 and Specification, page 8, lines 15-26. A gas stream is introduced into the container (1), and the gas stream takes up the oxidizable compounds from the particles (2) and a gas stream laden with the volatile oxidizable compounds is discharged from the container (1). See Fig. 1 and Specification, page 8, lines 15-26. Oxygen is added to the gas stream which has been discharged and the volatile oxidizable compounds present in the discharged gas stream are at least partly catalytically oxidized by means of the oxygen, thereby forming an oxidized gas stream. See Specification, page 2, lines 16-24. The oxidized gas stream forms at least part of the gas stream introduced into the container (1), so that the gas stream is circulated in a circuit, and the concentration of oxygen in the container (1) is below the explosive limit of about 7% by volume. See Specification, page 5, lines 7-18.

VI. GROUNDS OF REJECTIONS TO BE REVIEWED ON APPEAL

The Examiner's obviousness rejection of claims 1-12 and 19-21 over *Bobst et al.* (US 4,372,758) in view *Sobukawa et al.* (US 6,492,298).

VII. ARGUMENTS

MPEP §2142 provides: *To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).*

The claimed invention is not obvious because there is no suggestion or motivation to combine *Bobst et al.* and *Sobukawa et al.* and even if the referenced are combined, the claimed invention does not follow the combined reference teachings.

Bobst et al. discloses the following:

a) a process for removing unpolymerized gaseous monomers like ethylene from a solid olefin polymer, which process comprises;

b) introducing a purge gas stream like nitrogen into a purge vessel containing that solid olefin polymer;

c) the gas stream taking up the unpolymerized gaseous monomers ("countercurrently contacting polymer and purge gas");

d) discharging a gas stream laden with the unpolymerized gaseous monomers from the vessel;

e) recycling a portion of the discharged gas stream to the purge vessel, and

f) wherein the fed gases contain substantially no oxygen.

Subokawa et al. discloses an ordinary-temperature purifying catalyst which can decompose and remove environmental loading materials like ethylene in an ordinary temperature range by contacting the catalyst with air containing ethylene.

The process of claim 1 comprises above steps a) to e) of Bobst et al. However it lacks its feature f) and has the following additional steps:

g) adding oxygen to the discharged gas stream;

h) catalytically oxidizing the unpolymerized gaseous monomers, thereby forming an oxidized gas stream;

i) recycling (a portion of) the oxidized gas stream; and

j) keeping the concentration of oxygen in the vessel below the explosive limit of about 7% by volume.

Bobst et al. refers to a process for removing unpolymerized gaseous monomers like ethylene from a solid olefin polymer. As such, the *Bobst et al.'s* process is an improvement over prior state of the art. However, there is no suggestion in Bobst et al. to further improve the process by eliminating its step f) while adding steps g) through j).

Subokawa et al. relates to a specific catalyst for purifying air from, for example, ethylene. Such a catalyst for catalytic oxidation can in general be used to purify the discharge gas of a purge vessel if air is used as purge gas for removing unpolymerized gaseous monomers from solid olefin polymer (see page 1, lines 17 to 18 of the Appellants' specification). There is no indication in *Subokawa et al.* that its specific catalyst could be used for that purpose. The only disclosed field for using the specific catalyst of *Subokawa et al.* for removing ethylene is preventing fruit and vegetables from chronologically aging (see *Subokawa et al.*, column 4, line 57 to column 5, line 2).

Accordingly, there are no hints in *Subokawa et al.* for modifying any process for removing unpolymerized gaseous monomers like ethylene from a solid olefin polymer. Moreover, as already mentioned above, there is also no suggestion in *Bobst et al.* to further improve such a process. Thus, there is no motivation for a person skilled in the art to combine the teachings of *Bobst et al.* and *Subokawa et al.*

Furthermore, a person skilled in the art (of olefin polymerization) might have combined the process of *Bobst et al.* with the catalyst of *Subokawa et al.*, perhaps to reduce energy cost as postulated by the Examiner in the first full paragraph of page 5 of the Office Action dated June 4, 2009. However, that combination would not result in the process of the present invention because the above discussed elements g) through j) of the invention are missing from the art.

Therefore there is no motivation in *Subokawa et al.* to make all those modifications to the process of *Bobst et al.* to arrive at the present invention, which includes the following modifications:

- allowing oxygen to be present in the purge vessel;
- adding oxygen to the gas stream discharged from the purge vessel;
- placing an oxidation catalyst in the gas line after the oxygen feeding point and oxidize the unpolymerized gaseous monomers; and

- keeping the concentration of oxygen in the vessel below the explosive limit of about 7% by volume.

There is also no hint that such a modification will result in an especially safe and inexpensive way of removing residual monomers from polymer particles (see page 2 lines 1 to 3 of Appellants' specification).

It is improper for the Examiner to argue that all those features were within the level of ordinary skill at the time the claimed invention was made while neither the references nor the Examiner provides such evidence; the Examiner's arguments are rather hindsight reasoning solely based on Appellants' disclosure.

In view of the above arguments, Appellants respectfully request that the Honorable Board of Appeals reverse the Examiner's above obviousness rejections and obviousness double patenting rejections and allow Appellants' claims 1-12 and 19-21.

Respectfully submitted,
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Enclosures: Appendices VIII-X

VIII. CLAIMS APPENDIX

1. A method of safely removing at least one volatile oxidizable compound which can form an explosive mixture with oxygen from particles (2) present in a container (1), in which a gas stream is introduced into the container (1), the gas stream takes up the oxidizable compounds from the particles (2) and a gas stream laden with the volatile oxidizable compounds is discharged from the container (1),

   wherein

   (i) oxygen is added to the gas stream which has been discharged and the volatile oxidizable compounds present in the discharged gas stream are at least partly catalytically oxidized by means of the oxygen, thereby forming an oxidized gas stream; and

   (ii) the oxidized gas stream forms at least part of the gas stream introduced into the container (1), so that the gas stream is circulated in a circuit,

   and wherein the concentration of oxygen in the container (1) is below the explosive limit of about 7% by volume.

2. The method as claimed in claim 1, wherein the particles are polymer particles (2) and the volatile oxidizable compounds are at least one of residual monomers and solvents remaining in the polymer particles (2) after they have been produced.

3. The method as claimed in claim 2, wherein the polymer particles are solid polymer granules (2).

4. The method as claimed in claim 2, wherein the particles are sprayed liquid or wax-like polymer particles.

5. The method as claimed in claim 1, wherein the oxygen is added to the volatile oxidizable compounds in an essentially stoichiometric amount corresponding to that required for complete oxidation.

6. The method as claimed in claim 1, wherein the oxygen is added in the form of air.

7. The method as claimed in claim 6, wherein the amount of added oxygen is regulated on the basis of the content of oxygen and the volatile oxidizable compound measured in the oxidized gas stream.

8. The method as claimed in claim 1, wherein the oxidation is carried out with the aid of a catalyst whose active component comprises at least one noble metal selected from the group consisting of platinum, palladium and rhodium.

9. The method as claimed in claim 1, wherein the particles (2) are continuously introduced into the container (1) and discharged from the container (1).

10. The method as claimed in claim 8, wherein the gas stream is conveyed in countercurrent to the particles (2).

11. The method as claimed in claim 1 having a preceding start-up phase in which the circuit is purged with an inert gas.

12. The method as claimed in claim 11, wherein an oxygen content in the container (1) is increased continuously to a level of from 0.5 to 5% by volume during the start-up phase and is subsequently kept constant.

13. **(Withdrawn)** An apparatus for removing volatile, oxidizable compounds from particles, comprising:

(i) a container (1) for accommodating polymer particles (2), having a gas inlet (3) and a gas outlet (4),

(ii) a catalyst unit (5) containing an oxidation catalyst for oxidizing residual monomer by means of oxygen,

(iii) a gas circulation line comprising a gas outlet line (9) which connects the gas outlet (4) to the catalyst unit (5) and a gas return line (10) which connects the catalyst unit (5) to the gas inlet (3) and

(iv) an air metering unit (6) connected to the gas outlet line (9) for introducing oxygen into the gas outlet line (9).

14. **(Withdrawn)** The apparatus as claimed in claim 13 further comprising a polymer particle inlet (7) and a polymer particle outlet (8), where the polymer particle inlet (7) and the gas inlet (3) are located on one side of the container (1) and the polymer particle outlet (8) and the gas outlet (4) are located on an opposite side of the container (1) so that a gas stream and the polymer particles (2) can be conveyed in countercurrent.

15. **(Withdrawn)** The apparatus as claimed in claim 13, wherein the container is a silo (1) for the storage of granulated polymer (2).

16. **(Withdrawn)** The apparatus as claimed in claim 13, wherein the oxidation catalyst comprises a bundle of conventional monolithic three-way or oxidation catalysts for automobile exhaust gas purification.

17. **(Withdrawn)** The apparatus as claimed in claim 13, wherein the catalyst unit (5) can be operated autothermally.

18. **(Withdrawn)** The apparatus as claimed in claim 13, which further comprises:

(i) a lambda probe for measuring an oxygen content in the return line (10); and

(ii) a regulating unit which regulates the amount of oxygen introduced through the air metering unit (6) on the basis of the oxygen content measured by means of the lambda probe.

19. The method of claim 3, wherein the polymer granules are polyolefin granules.

20. The method of as claimed in claim 11, wherein the inert gas is nitrogen.

21. The method as claimed in claim 12, wherein the oxygen content in the container (1) is from 1 to 4% by volume.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.